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Helping shrubland birds

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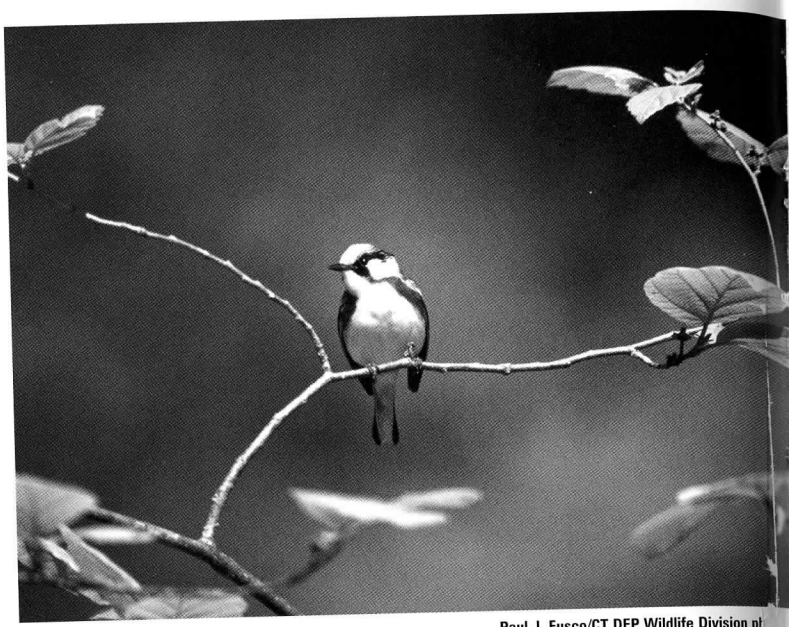
Create a shrubland...
Another quiet decline

This article combines sections of chapter 2 in the book Restoring North America's Birds: Lessons from Landscape Ecology, *by Robert A. Askins, copyright 2000, Yale University Press. The author is chairman of the Connecticut College zoology department. Dr. Askins argues that shrublands were part of the pre-Colonial landscape in Connecticut, so it's logical for us to create forest openings to help shrubland birds. Dr. Askins has written a new conclusion for Connecticut Woodlands. The rest of the passage is used with the permission of Yale University Press.*



Chestnut-sided Warbler Paul J. Fusco/CT DEP Wildlife Division ph

Shrubland birds, like grassland birds, are frequently seen as interlopers to the East, either colonizing the area or increasing to unprecedented densities after the land was cleared by European settlers. The history of the Chestnut-sided Warbler is often cited in support of this view. This species, which is now widespread and common, was so rare in the East in the early 1800s that only a handful of specimens were seen or collected by the most active ornithologists of the time. Alexander Wilson and Thomas Nuttall observed only a few individuals. John James Audubon describes shooting five Chestnut-sided Warblers during a single May morning in 1808 at Pottsgrove, Pennsylvania. In *Ornithological Biography* (1831) Audubon wrote that he never encountered this species again and had no idea where it might nest. However, Audubon may have obtained additional information before he wrote the text for the octavo edition of *Birds of North America* several years later: here he described the Chestnut-sided Warbler as "rather common" from Texas northward.

Regardless of the exact status of the Chestnut-sided Warbler in the early 1800s, it is clear that its population showed an explosive increase in the second half of the nineteenth century. The proliferation of Chestnut-sided Warblers is frequently attributed to the clearing of the primeval forest after Europeans settled North America, which allowed a species restricted to forest openings to expand across the landscape. Many regions along the East Coast had been settled up to 200 years before the dramatic increase in Chestnut-sided Warbler, however, and it is more likely that the population explosion was triggered not by the clearing of new farms, but by the abandonment of old farms. As Edward Howe Forbush wrote, this species "is not a frequenter of deep woods, nor yet of well-kept gardens, orchards or farmlands, but prefers neglected or cut-over lands, with a profusion of thickets and briers." Throughout the second half of the nineteenth century, farms failed in rocky and hilly regions in the eastern United States, resulting in the steady generation of shrubby, abandoned fields that became the prime habitat for Chestnut-sided Warblers and other shrubland birds.

The rarity of the Chestnut-sided Warbler in the early 1800s remains an enigma, however, because many of the species that share its scrubby habitat were common at that time. Audubon described the habitat of Prairie Warblers in New Jersey as "large openings where the woods had been cut down, and were beginning to spring up," and he recorded Blue-winged Warblers as frequent in the "barrens of Kentucky." He wrote that the Brown Thrasher, which is found in open shrubland, was a "constant resident of the United States. Immense numbers are found in the South, and in all our Eastern States in spring and summer." Audubon described another shrubland species, the Yellow-breasted Chat, as "extremely plentiful in Louisiana, Georgia, and the Carolinas" and "equally abundant in Kentucky, particularly in the barrens of that state; and it ascends the Ohio, spreading over the country, and extending as far as the borders of Lake Erie in Pennsylvania." Moreover, 100 years before Audubon, Mark Catesby described how Yellow-breasted Chats in the Carolinas "frequent the banks of great rivers and their loud chattering noise reverberates from the hollow rocks and deep cane swamps."

Shrublands before European clearing

Many natural processes can produce shrublands. Periodic flooding of river banks can create a shrubby fringe

along rivers, and grassy beaver meadows and other types of grassland are eventually invaded by shrubs and small trees. Moreover, shrubs, tree saplings, and resprouting trees immediately become established in many of the large clearings created by wind storms and fires, so forest is converted directly to thicket rather than grassland. Thus, the canopy of the presettlement forest was broken not only with grassy openings but also with shrubby tangles. Many of these were small, but others were large enough to provide habitat for shrubland birds.

Where the soil is continually waterlogged, shrublands may be relatively stable for a long period, providing a dependable habitat for shrubland birds. Bogs and other shrubby wetlands embedded in northern forests provide habitat for a diversity of shrubland species. For example, in Michigan, bogs support Willow Flycatchers, Eastern Towhees, and Field Sparrows, and shrub wetlands support Willow Flycatchers (in the southern part of the state) and Chestnut-sided Warblers (in the north).

Creation of shrublands by people

For at least the past millennium shrubland birds have become increasingly dependent on forest openings created by people. Before Europeans settled the eastern forest, shrublands and thickets resulted from agricultural clearing and forest burning by Indians. Slash-and-burn agriculture, in particular, would have produced a continual supply of habitat for shrubland birds, but even permanent agriculture would generate brushy fields, both fallow and abandoned. Also, periodic burning to improve hunting produced particularly large shrublands. In 1804, Timothy Dwight traveled through an area along the Genesee River in western New York before it was settled by Europeans. He found five openings in the forest, large expanses covered with "grass, weeds and shrubs." Judging by fire scars on the few remaining trees, Dwight concluded that Indians had burned the area to create "pasture grounds" for deer. Before European settlement, both natural and human disturbance produced large areas of early successional, woody habitat.

The Prairie Warbler Paul J. Fusco/CT DEP Wildlife Division photo

The Blue-winged Warbler Paul J. Fusco/CT DEP Wildlife Division photo

During the first two centuries of European settlement, intensive grazing and farming probably reduced the amount of habitat not only for birds of the mature forest, but also for the shrubland birds associated with regenerating forest. Beginning in the 1840s, however, many farms were abandoned in hilly and rocky regions as farmers moved into flatter and more fertile regions west of the Appalachians. Since the middle of the nineteenth century, farms have been progressively abandoned in many parts of New England, New York, and the Southeast, creating a continuous supply of brushy old fields filled with such birds as Yellow-breasted Chats, White-eyed Vireos, Chestnut-sided Warblers, Blue-winged Warblers, and Bachman's Sparrows. Many of these species undoubtedly experienced population explosions during this period, increasing far beyond population levels characteristic of either the heavily forested presettlement landscape or the heavily agricultural eighteenth-century landscape.

In many parts of the East, the rate of farm abandonment diminished by the middle of the twentieth century. Eventually most of the remaining farms were in areas with rich soils and high productivity. In regions with poorer conditions for farming (for example, most of New England and the mountainous Southeast) the number of farms became so small that few were left to be abandoned, and many of these were converted directly to housing developments. Consequently, old fields have become scarce, reducing the amount of habitat for both grassland and shrubland birds. In New Hampshire, for example, the forest cover increased from 47 percent in 1880 to 87 percent in 1980. This

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dramatic shift occurred largely because farmland was abandoned at a rapid rate during this period. Between 1880 and 1930, farmland in New Hampshire was abandoned at a rate of 32,000 acres per year, but the rate of farm abandonment dropped quickly after this period, and by 1960 most of the previously abandoned old fields had become forest. In the five New England states south of Maine, the amount of forest in what foresters call the "seedling and sapling" stage (the stage used by shrubland birds) fell from as much as 29 percent in 1950 to 14 percent in the early 1970s and to 8 percent in the 1980s. Thus, it is not surprising that decreases in shrubland bird populations have been particularly severe in New England, and that two species that require large areas of shrubland, the Yellow-breasted Chat and the Golden-winged Warbler, are now listed as endangered or threatened in states where they were previously common. Also, the New England cottontail, a species of rabbit found in areas dominated by shrubs and tree seedlings and saplings, has declined so severely throughout its range that it is listed as a candidate for federal endangered or threatened status. The loss of shrub habitat has been equally rapid and severe in some other eastern states. For example, in New York the amount of commercial forest land in the early successional "seedling/sapling" stage declined from 30 percent in 1980 to 16 percent in 1993.

Birds in clearcuts and along powerlines

The management program for the Kirtland's Warbler shows that habitat can be tailored to meet the needs of an early successional specialist, although even in this case it was apparently difficult to produce enough habitat without help from an unusually large fire. Creating the right conditions for species that do not require such large areas of habitat might be easier, but in most parts of eastern North America, it would still require continual, and expensive, removal of trees to prevent succession to forest. Except when threatened or endangered species are at risk, it is difficult to find support for this type of vegetation management. Consequently, shrubland birds, like grassland birds, now largely depend on the generation of habitat because of economic activities. Instead of hay meadows, fallow fields, and air fields, the critical artificial habitats for shrubland birds are two of the least popular features of the landscape: clearcuts and powerline corridors. Harvesting timber by clearing large, continuous areas of forest typically results in a dense growth of low shrubs, saplings, and stump sprouts that provides habitat for most of the species of shrubland birds that have been declining in the East. In Virginia, clearcuts support populations of Yellow-breasted Chats, Prairie Warblers, Golden-winged Warblers, and Field Sparrows from the third to the twelfth year after cutting. When the canopy closes, these shrubland specialists are replaced by forest birds, such as Red-eyed Vireo, Black-and-white Warbler, and Ovenbird. In northern Maine, recent clear-cuts are occupied by a diversity of early successional species, including Alder Flycatcher, Magnolia Warbler, Palm Warbler, Mourning Warbler, Chestnut-sided Warbler, and Chipping Sparrow. Thus, rotational clear-cutting, in which a small proportion of a forest is cut periodically, can provide good habitat for shrubland birds. This approach will not be appropriate in areas with steep slopes or thin soils because of problems created by soil erosion and runoff, and it may be inappropriate in forests where conservation of woodland salamanders or spring ephemeral wildflowers is a high priority. Clearcutting would never be appropriate for the few remaining patches of old-growth forest in the East; these ancient forests provide some of our

The Eastern Towhee Paul J. Fusco/CT DEP Wildlife Division pho

The Blue-winged Warbler Paul J. Fusco/CT DEP Wildlife Division illustration

best information on how forest ecosystems worked in areas protected from frequent natural disturbance. However, on suitable sites, clearcuts can be used to maintain a wide range of successional stages, especially when the rotation time between harvests is long enough to permit the forest to mature. Although selective cutting may appear less disruptive than clearcutting, it does not create habitats needed by many early successional species.

A study of bird populations in 45 recent clearcuts in Moosehorn National Wildlife Refuge in Maine showed that shrubland birds are equally frequent in small and large clearcuts. These sites ranged in size from 5-277 acres. Similarly, when Benjamin Zuckerberg, Christopher Schafer, and I surveyed 34 clearcuts that ranged in size from 1.5 to 52 acres in several state forests in eastern Connecticut, we found that Chestnut-sided, Prairie, and Blue-winged warblers were equally frequent in clearcuts of different sizes. Only Eastern Towhees were significantly more frequent at survey plots in large clearcuts than in similar plots in small clearcuts. In Green Mountain National Forest in Vermont, even tiny clearcuts (called group selection cuts) that cover about one acre can support such shrubland birds as Chestnut-sided Warbler and Mourning Warbler. Apparently many shrubland species do not require large, continuous areas of shrubby habitat. In some cases, however, it may be better to cluster or consolidate clearcuts to minimize disruption of the expanses of continuous mature forest needed by many species of forest-interior birds.

Clearcutting has the advantage of paying for itself; there is a financial incentive for harvesting trees. Another artificial habitat in which there is a financial incentive to maintain low, shrubby vegetation is the open corridor underneath powerlines. Power companies traditionally have maintained these corridors by mowing or "brush hogging" (mechanically chopping up low, woody vegetation), or by broadcast spraying of herbicides. These methods produce grassy corridors with few species of birds or other animals. However, mechanical removal of vegetation is expensive, and blanket spraying of herbicides has been banned in many communities because of health and environmental concerns. In the 1970s another approach to powerline management was introduced: the establishment of a thick shrubland that is relatively resistant to the invasion of trees. Initially this is labor-intensive and expensive: workers must cut each young tree and spray each stump or the base of each tree with herbicide. This precisely directed use of herbicide (as opposed to indiscriminately spraying the entire powerline corridor) can remove trees, allowing shrubs and vines to spread out. These create a thick barrier that shades out most tree sprouts and seedlings. The result is a relatively stable shrub community, often with a diversity of plant species, that requires only occasional maintenance.

The vegetation along powerline corridors typically supports a rich diversity of shrubland birds. For example, one of the first powerline corridors managed for stable shrublands, a demonstration plot established in the Connecticut College Arboretum in 1953, still supported breeding pairs of White-eyed Vireos; Blue-winged, Chestnut-sided, Prairie warblers; and Field Sparrows in 1993. Wide powerline corridors managed by selective tree removal in Pennsylvania and Maryland support an even greater diversity of shrubland birds, including Yellow-breasted Chats and Golden-winged Warblers, two species that require relatively large areas of continuous shrubland habitat. In Maryland, a high proportion of birds nesting along powerline corridors are successful in raising young, indicating that this habitat could potentially support stable populations of shrubland birds. Similarly, birds nesting along a powerline corridor in central Pennsylvania had high rates of nest success because of low rates of cowbird parasitism and nest predation. Although powerline corridors can have a negative impact on forest bird species that require large expanses of uninterrupted forest, they can make a useful contribution by sustaining populations of shrubland birds.

Eventually, as beavers return to more regions in the eastern forest and as the forests age and produce more large canopy gaps, natural processes may provide much of the habitat needed by shrubland birds. Until then, many of these species will continue to depend on the activities of people -- on the abandonment of farms and pastures, the harvesting of timber, and the maintenance of powerline corridors and other shrubby openings in the forest.

Managing private property for shrubland birds

I've frequently heard people describe, with some sadness, the loss of shrubland birds from their property. This happens when someone buys a house surrounded by abandoned pastures and fields. During the first few years, these old fields attract a variety of early successional birds, many of which have distinctive songs and bright colors. The vibrant yellow of Prairie Warblers, the double buzz of Blue-winged Warblers and the loud, querulous songs of White-eyed Vireos become signs of spring and early summer for the homeowner. Within a decade, however, the old field grows into a young forest, and these species disappear.

This process is not inevitable. If you want to retain these species (many of which are declining throughout New England), then you can arrest succession and keep old fields in shrubland. The approach used by power companies to create shrublands along powerline corridors can be applied on small parcels of land to favor early successional species.

To prevent the successional change to forest, tree seedlings and saplings must be cut down. Herbicides can be applied to their stumps to prevent resprouting. Also, some species of shrubs can be favored while others are removed.

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Autumn olive looks good, but causes problems.

Paul J. Fusco/CT DEP Wildlife Division photo

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For example, you might want to favor native species and remove introduced species (although this may not have much effect on birds, which seem to respond to the height and density of the vegetation more than to particular species of plants). Shrubs with colorful displays of blossoms or berries can be favored or planted along the edge of the field or along trails to make the field more attractive. With occasional (but labor intensive) maintenance, you can establish a relatively stable shrub community where a dense mass of shrubs prevents trees from becoming established.

Even a 2- or 3-acre patch of scrubby vegetation can support several species of shrubland birds. This probably reflects the evolutionary history of early successional forest birds in eastern North America. They once lived in a heavily wooded landscape where many of the scrubby openings, such as beaver meadows, eroded river banks and recent blowdowns, were small. Consequently, even people who own relatively small properties can maintain or create appropriate habitat for shrubland birds. In contrast, you need a meadow larger than 10 acres to attract most species of grassland birds, and some species of forest birds require hundreds of acres of unbroken forest. Only private landowners with large holdings or with property abutting a protected grassland or forest can effectively manage their land for many of the specialized grassland and forest bird species.

Landscaped gardens are often dominated by shrubs, and if these gardens are large enough and have little or no tree canopy, they may support nesting shrubland birds such as White-eyed Vireos and Brown Thrashers. Even gardens that are too small to support breeding pairs of these species may be important as migratory stopover sites for birds moving between their northern breeding areas and their southern wintering areas. After migrating for hundreds of miles during the night, these migrants need a place to feed and hide from predators during the day. Even small patches of garden shrubs will attract migrating shrubland birds, which tend to gravitate to any shrubby habitat.

Gardens will be more attractive if there are some deciduous shrubs, which tend to have a high concentration of insect prey, and if some of the shrubs bear fruit during the fall. Many native shrubs produce berries during the peak of the songbird migration because they have evolved to have their seeds dispersed by migrants. Imported shrubs also may have evolved for dispersal by migrating songbirds, but their timing will be geared to the migration in Japan or northern Europe rather than to the schedule in New England.

Whether you create a semi-natural shrubland in an old field or a highly artificial shrubland in a landscaped garden, you can attract shrubland species and add to the natural diversity of your surroundings. In the process, you will help to sustain bird species that are declining throughout the northeastern United States.